Listing of Claims:

1. (Currently amended) A high resolution objective lens assembly formed with refractive components that are substantially free from image-distorting intrinsic birefringence effects of a kind exhibited by calcium fluoride operating at 157 nm and cooperate to provide a high numerical aperture lens assembly operating with a specified deep ultraviolet wavelength of light carrying a subject image, comprising:

first and second lens groups including no more than eight optical components formed of high index of refraction lens element substrate material and cooperating to form a magnified, aberration-corrected image at an image plane, the lens element substrate material including a specially doped fused silica optical material;

the first lens group including an aberration correction and compensation lens element positioned to receive nonconverging light rays of a specified wavelength, the light rays carrying a subject image; and

the second lens group including a converging lens element positioned to receive light rays propagating from the first lens group and converge the light rays carrying the subject image to form the magnified, aberration-corrected image at the image plane.

2. (Canceled)

3. (Previously presented) The lens assembly of claim 1, in which the specially doped fused silica optical material includes a fluorinated fused silica optical material.

4. (Original) The lens assembly of claim 1, in which the specified wavelength is 157 nm.

5. (Original) The lens assembly of claim 1, in which the magnified image is produced by fractional magnification of the subject image.

6. (Previously presented) A high resolution objective lens assembly formed with refractive components that are substantially free from image-distorting intrinsic birefringence effects of a kind exhibited by calcium fluoride operating at 157 nm and cooperate to provide a high numerical aperture lens assembly operating with a specified deep ultraviolet wavelength of light carrying a subject image, comprising:

first and second lens groups including optical components formed of high index of refraction lens element substrate material and cooperating to form a magnified, aberration-corrected image at an image plane, all of the optical components of the first and second lens groups formed of refractive lens materials;

the first lens group including an aberration correction and compensation lens element positioned to receive nonconverging light rays of a specified wavelength, the light rays carrying a subject image; and

the second lens group including a converging lens element positioned to receive light rays propagating from the first lens group and converge the light rays carrying the subject image to form the magnified, aberration-corrected image at the image plane, the second lens group including a final lens element having a plano exit surface and a liquid interface film resident at the plano exit surface to provide for the lens assembly a numerical aperture of greater than 1.0.

7. (Original) The lens assembly of claim 6, in which the numerical aperture is about 1.30 for a specified wavelength of 157 nm.

8. (Original) The lens assembly of claim 6, in which the plano exit surface is positioned in contact with a thin liquid film resident at the image plane.

9. (Previously presented) A high resolution objective lens assembly formed with refractive components that are substantially free from image-distorting intrinsic birefringence effects of a kind exhibited by calcium fluoride operating at 157 nm and cooperate to provide a high numerical aperture lens assembly operating with a specified deep ultraviolet wavelength of light carrying a subject image, comprising:

first and second lens groups including optical components formed of high index of refraction lens element substrate material and cooperating to form a magnified, aberration-corrected image at an image plane, all of the optical components of the first and second lens groups formed of refractive lens materials;

the first lens group including an aberration correction and compensation lens element positioned to receive nonconverging light rays of a specified wavelength, the light rays carrying a subject image; and

the second lens group including a converging lens element positioned to receive light rays propagating from the first lens group and converge the light rays carrying the subject image to form the magnified, aberration-corrected image at the image plane, the second lens group including a final lens element having a concave exit surface to provide for the lens assembly a numerical aperture of about 0.90 for a specified wavelength of 157 nm.

10. (Original) The lens assembly of claim 1, in which the optical components of the first and second lens groups are of a type arranged in the form of a catadioptric design,

each of the first and second lens groups including a lens element comprising a mirror attached to a refractive substrate.

11. (Original) The lens assembly of claim 10, further comprising an aperture stop positioned between the first and second lens groups.

12. (Original) The lens assembly of claim 10, in which the first lens group includes a perforated meniscus lens element having an entrance mirror surface.

13. (Original) The lens assembly of claim 10, in which the second lens group includes a meniscus lens element having an entrance surface coated with a mirror central spot.

14. (Previously presented) A high resolution objective lens assembly formed with refractive components that are substantially free from image-distorting intrinsic birefringence effects of a kind exhibited by calcium fluoride operating at 157 nm and cooperate to provide a high numerical aperture lens assembly operating with a specified deep ultraviolet wavelength of light carrying a subject image, comprising:

first and second lens groups including optical components of a type arranged in the form of a catadioptric design and formed of high index of refraction lens element substrate material, the first and second lens groups cooperating to form a magnified, aberration-corrected image at an image plane, and each of the first and second lens groups including a lens element comprising a mirror attached to a refractive substrate;

the first lens group including an aberration correction and compensation lens element positioned to receive nonconverging light rays of a specified wavelength, the light rays carrying a subject image; and

the second lens group being of a compound lens type and including converging and convex-plano lens elements, the converging lens element positioned to receive light rays propagating from the first lens group and converge the light rays carrying the subject image to form the magnified, aberration-corrected image at the image plane, and the convex-plano lens element having a plano exit surface and a liquid interface film resident at the plano exit surface to provide for the lens assembly a numerical aperture of greater than 1.0.

15. (Original) The lens assembly of claim 14, in which the plano exit surface is positioned in contact with a thin liquid film resident at the image plane.

16. (Original) The lens assembly of claim 14, in which the numerical aperture is about 1.10 for a specified wavelength of 157 nm.

17. (Original) The lens assembly of claim 13, in which the numerical aperture is about 0.80 for a specified wavelength of 157 nm.

18. (Original) The lens assembly of claim 1, further comprising a tube lens positioned to receive the subject image-carrying light before it is incident on the first and second lens groups to provide a quasi-collimated beam space between the tube lens and the first lens group.

19. (Previously presented) The lens assembly of claim 14, in which the second lens group further includes a meniscus lens element having an entrance surface coated with a mirror central spot.

20. (Previously presented) A high resolution objective lens assembly formed with refractive components that are substantially free from image-distorting intrinsic birefringence effects of a kind exhibited by calcium fluoride operating at 157 nm and cooperate to provide a high numerical aperture lens assembly operating with a specified deep ultraviolet wavelength of light carrying a subject image, comprising:

first and second lens groups including optical components formed of high index of refraction lens element substrate material and cooperating to form a magnified, aberration-corrected image at an image plane, all of the optical components of the first and second lens groups being formed of refractive lens materials;

the first lens group including an aberration correction and compensation lens element positioned to receive nonconverging light rays of a specified wavelength, the light rays carrying a subject image; and

the second lens group including a converging lens element positioned to receive light rays propagating from the first lens group and converge the light rays carrying the subject image to form the magnified, aberration-corrected image at the image plane.